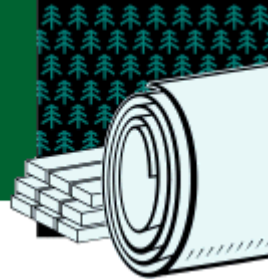


# FOREST PRODUCTS

## Project Fact Sheet



### DIAGNOSING AND CORRECTING SOIL NUTRIENT LIMITATIONS IN INTENSIVELY MANAGED SOUTHERN PINE FORESTS

#### BENEFITS

- Matches nutrient demand and soil supply during stand rotation
- Enhances forest productivity
- Maintains forest health
- Provides new information on slash and loblolly pine
- Compliments other research on soil limitations in forestry
- Simplifies management of Southeastern commercial forests

#### APPLICATIONS

A model will be developed and made available to the forest products industry, which will evaluate fertilizer strategies for maximizing site productivity.

#### Management of Soil Fertility Will Ensure Forest Productivity and Sustainability

Soils of the southeastern United States are inherently infertile. Moreover, existing nutrients are rapidly depleted by the intense cultivation of fast-growing commercial tree species in the region. Although forest plantations growing in these soils are fertilized regularly, resultant productivity is below minimum expectations for these sites.

More information is needed to match the nutrient requirements of rapidly growing forest stands and the supply of soil nutrients. This will become more important as forest management moves toward integrating genetics and silviculture to develop strains of disease-resistant trees that grow rapidly and yield high-quality wood.

Researchers will develop a model to predict the balance between nutrient demand and supply. This will allow them to determine the appropriate forest management strategy for a specific site. This project will also provide the industry with new information on the nutritional requirements of slash and loblolly pine.

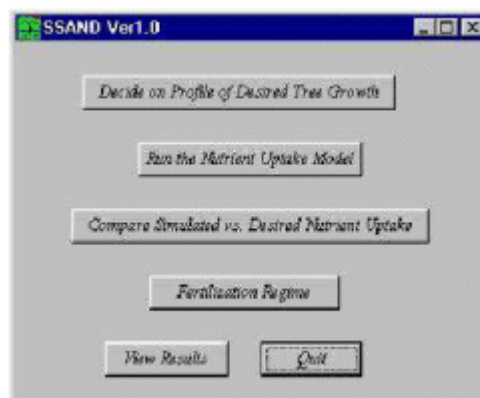


Figure 1. The diagram shows the first page of the proposed hybrid model for recommending fertilizer regimens.



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## PROJECT DESCRIPTION

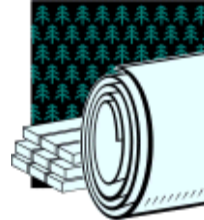
**Goal:** To develop a hybrid model that can recommend fertilizer regimens for Southeastern commercial forests, and to calibrate and field test the model.

Researchers will combine two existing models in order to develop a hybrid model for recommending fertilization schedules. The COMP8 model can evaluate the effects of fertilization on plant nutrient uptake, and has been applied successfully in the greenhouse and in field conditions. NUTRICALC is an empirical model that defines the nutrient demand of a stand, evaluates the soil nutrient supply, compares the plant nutrient demand to soil supply, and recommends fertilization. NUTRICALC has been used in the cultivation of eucalyptus in Brazil. A hybrid model will be derived from the features of these two techniques.

The model will focus on nitrogen, phosphorus, and potassium requirements of slash and loblolly pines from age 0–4 years. The model will be calibrated and field-tested at forestry research sites in the Southeast, where heavy fertilization trials are already underway.

## PROGRESS & MILESTONES

- DOE funding for this project began in 1999 and is scheduled for completion by 2002.
- Researchers have examined root to shoot ratios for use in nutrient demand modeling.
- Model development is based on ongoing field data analysis of biomass, soil, and tissue with varied fertilization regimes.
- Researchers will continue to test and calibrate the model; a publication on biomass development is expected to follow.



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